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Title : DEVELOPER SUPPLY APPARATUS

## SPECIFICATION

### 1. Title of the Device

Developer supply apparatus

### 2. Scope of Claims for Utility Model Registration

A developer supply apparatus having a configuration such that a discharge opening of a developer container containing a developer is sealed by a sealing member, wherein a protruding member for allowing the sealing member to penetrate into a developer tank storing the developer, and an elastic lid opening or closing by attachment or detachment of the container are arranged.

### 3. Detailed Description of the Device

The present device relates to a developer supply apparatus for supplying a developer to a development apparatus in an electrostatic recorder such as an electrophotographic copying machine.

Generally in the electrostatic recorder, an electrostatic latent image on a charge holder is developed by the development apparatus, to form a toner image, and then the toner image is transferred onto and

fixed on recording paper. Since the toner is consumed at the time of development, it is necessary to supply the toner to the development apparatus constantly based on the consumption, and a developer tank is provided as a storage unit of the toner to be supplied. A large amount of toner is stored in the developer tank, and before the toner therein has been consumed, the toner is supplied from a developer supply container.

Since the toner is formed of fine particles of dry and powdery resin having a diameter of several tens micrometers and having a light specific gravity, the toner is likely to scatter.

Conventionally, when the toner is supplied to the developer tank, the toner is supplied by inserting an opening of a bottle container (A in Fig. 1) or a baglike container (B in Fig. 2) filled with the toner into a developer supply port of the developer tank.

However, when the opening of the bottle or baglike developer container is inserted into the developer supply port to supply the toner into the developer tank, a large amount of toner scatters like smoke at the time of outflow and drop of the toner, is discharged to the outside from near the supply port and drifts in the air, to adhere to the inside and outside of the recorder. Therefore, the scattering toner not only damages the function and the appearance of the recorder, but also contaminates the indoor air and other environments, making the body and clothes of an operator stained.

It is an object of the present device to provide a developer supply apparatus that can prevent the developer from scattering to the

outside of the developer tank, when the developer is supplied to the developer tank. That is, a developer supply apparatus having a configuration such that a discharge opening of the developer container containing the developer is sealed by a sealing member, wherein a protruding member for allowing the sealing member to penetrate into the developer tank storing the developer, and an elastic lid opening or closing by attachment or detachment of the container are arranged, can satisfy the above object.

Exemplary embodiments of the present device will be specifically explained with reference to the accompanying drawings.

Fig. 3 is a cross section of the developer container according to the present device. A developer container 1 is formed of a body portion 1A having a bottle shape for storing a developer T, and a developer discharge port 1B having an appropriate opening diameter located above the body portion 1A, to form an integral structure. These body portion 1A and discharge port 1B can be integrally formed by using a plastic material such as polyethylene and polypropylene, or the discharge port made of plastic or metal is joined to the body portion 1A made of resin-treated carton. If a part or the whole of the container is made transparent or semitransparent, so that the content amount of the developer to be contained therein is visible, completion of supply of the developer can be easily confirmed. Furthermore, the inside of the discharge port 1B of the container 1 is sealed by a sealing member 2, to prevent leakage of the contained developer T. The sealing member 2 is made of a metal thin film such as aluminum foil, converted paper, or a

plastic film, and strongly bonded to the inside of the discharge port. The sealing member 2 is formed of a material and in a thickness that makes the sealing member 2 be easily broken through by a protruding member described later, at the time of supplying the developer.

Fig. 4 is a cross section of the developer tank according to the present device. The developer tank 10 includes a housing 10A for storing the developer T, an opening 10B constituting the developer supply port and fitted to the side wall of the developer container 1, an outer lid 11 for opening/closing the upper part of the opening 10B at the time of supplying the developer, an elastic lid 12 fitted at the bottom of the opening 10B and freely openable, linked with the attachment/detachment of the developer container 1, at the time of supplying the developer, and the protruding member 13 fixed on the lower part of the inside of the housing 10A of the developer tank.

The elastic lid 12 is made of a material such as polyethylene, polypropylene, polyurethane, other plastics, or synthetic rubber such as neoprene, in a single layer or a laminated layer, and as shown in Fig. 5, has a plurality of radial notches. A plurality of tongue pieces formed by these notches have elasticity respectively, and becomes an open state when pushed open by an external force, and returned to the plate-like shape when the external force is removed and closed.

The protruding member 13 fixed on the lower part of the inside of the housing of the developer tank is made of a metal such as stainless steel or aluminum, or a hard plastic material. The point 13A thereof is sharp and acts for breaking through the sealing member 2. A tapered

portion 13B acts for largely cleaving the sealing member 2, and a shoulder portion 13c is a shoulder-type bumping portion, which abuts against the discharge port 1B for holding the container 1 at a predetermined height. The protruding member 13 has a plurality of deep grooves 13D formed on the side thereof, to form a flowing passage for the developer discharged from the developer container. The shape of the deep grooves 13D can be spiral deep grooves such as a twist drill, or straight deep grooves such as a straight reamer, and an appropriate dimension is required for the deep grooves to supply the developer quickly.

Fig. 6 is a cross section of a state in which the developer container 1 and the developer tank 10 according to the present device are connected to supply the developer.

A protective cap (not shown) of the developer container 1 containing the developer T is removed, to open the outer lid 11 of the developer tank 10. The container 1 is inserted and pressed into the opening 10B of the developer tank 10, while holding the container 1 in an inverted state, and is reliably pressed down until the point of the discharge port 1B of the container bumps against the shoulder portion 13C of the protruding member.

Supply of the developer is started by the following actions, together with the pressing operation of the container. That is, the elastic lid 12 is pressed open, and as the container is lowered down further, the sealing member 2 of the container is broken through by the point 13A of the protruding member 13, and is largely cleaved by the

tapered portion 13B, to make the container and the developer tank continuous. The developer T in the container flows down along the deep grooves 13D and is filled in the housing 10A of the developer tank. During this process, the developer T is supplied without flowing outside.

After the completion of supply of the developer into the developer tank, the container 1 is taken out. The elastic lid 12 then automatically closes due to the own elastic strength of stability, and hence, the smoke of the developer in the developer tank 10 hardly leaks to the outside. When the container 1 is pulled out from the opening 10B of the developer tank and the outer lid 11 is closed, leakage of the developer from the developer tank 1 and foreign material mixing in from outside of the developer tank 1 are completely cut off, and the developer tank becomes a sealed state.

Fig. 7 depicts a perforated cap member 3 as another embodiment of the sealing member 2. Fig. 7 is a plan view of a developer container in a sealed state by using the cap 3. A perforated line indicated by broken line in the figure is formed substantially circumferentially, except of a part thereof, and the perforated line is shallow so that the developer does not leak out, and has a shape easily cut off by an external force. The cap is made of converted paper or the like, and is strongly sealed to the inside of the discharge port 1B of the container by an adhesive or the like.

When supplying the developer, the developer container is inserted into the developer tank, to cleave the cap member 3 by the protruding member 13, except the part thereof, so that the developer in

the container is allowed to pass therethrough and be discharged.

After completion of supply, even if the container 1 is pulled out, since the cap member 3 remains in the container 1, the cap member 3 does not fall into the developer tank 10.

The developer supply container and the developer tank according to the present device are useful for use as a toner supply container in a two-component developer containing powdery magnetic carrier and powdery resin toner, a supply container for a one-component developer in which magnetic powders are dispersed in the powdery resin toner, or a supply container for other developers (spray developer) similar to these, that is, are useful for all kinds of powdery developer supply containers.

As is obvious from the above explanation, when the developer is supplied to the development apparatus such as a copying machine, by using the developer supply apparatus including the developer supply container and the developer tank according to the present device, the container is connected to the supply opening of the developer tank in the sealed state, the sealing member of the container is cleaved largely in the connecting part in the sealed state by the operation of pressing down the container, to supply the developer. As a result, various problems due to scattering and leakage to the outside of the developer can be prevented, thereby enabling easy developer supply operation. There is also an advantage that the supply apparatus can be configured in a simple manner.

#### 4. Brief Description of the Drawings

Figs. 1 and 2 are respectively a perspective view and a cross section of the state of supplying a developer by a conventional developer container;

Fig. 3 is a cross section of the developer container according to one embodiment of the present device;

Fig. 4 is a cross section of the developer container according to another embodiment of the present device;

Fig. 5 is a perspective view of an elastic lid in a developer tank according to the present device;

Fig. 6 is a cross section of a state of supplying the developer by a developer supply apparatus according to present device; and

Fig. 7 is a plan view of a developer container in another embodiment of the present device.

1 ... Developer container,      2 ... Sealing member,

3 ... cap member,      10 ... Developer tank,

12 ... Elastic lid,      13 ... Protruding member,

T ... Developer.



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④ 現像剤補給装置

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## 明 細 書

### 1. 考案の名称

#### 現像剤補給装置

### 2. 実用新案登録請求の範囲

現像剤を内包する現像剤容器の吐出口をシール部材で密封した構成となし、かつ現像剤を収容する現像剤タンク内に前記シール部材を貫通するための突起部材と、前記容器の着脱により開閉する弾性蓋とを配設したことを特徴とする現像剤補給装置。

### 3. 考案の詳細な説明

本考案は電子写真複写機等の静電記録装置の現像装置に現像剤を補充するための現像剤補給装置に関するものである。

一般に静電記録装置にあつては、電荷保持体上の静電潜像を現像装置によって現像し、トナー像としたのち、これを記録紙上に転写定着することになされている。トナーは現像と共に消費されるので、消費に応じてたえずトナーを現像装置に補給することが必要で、補給するトナーの貯蔵部と



して現像剤タンクがある。現像剤タンクには大量のトナーを内蔵させておいて、これが消費し尽されるまえに、現像剤補給容器からトナーの補給がなされている。

トナーは十数 $\mu\text{m}$ 径の微粒子で軽比量かつサラサラした粉体状の樹脂なため極めて飛散しやすい。

従来、上記トナーを現像剤タンクに補充する場合、トナーを充填したボトル状容器（第1図中のA）または袋状容器（第2図中のB）の開口部を前記現像剤タンクの現像剤補給口に挿入することによりトナー補充を行なっている。

しかしながら、前記ボトル状又は袋状の現像剤容器は、その開口部を現像剤補給口に挿入してトナーを現像剤タンク内に補充する際に、トナーは流出落下と共に、大量のトナーが噴煙状となって飛散し、前記補給口付近から外部に放出し空中に浮遊して、記録装置の内外に付着してその機能外観を低下させるばかりでなく、室内空気その他の環境を汚染したり、操作者の身体衣服を汚す等の弊害を生ずる。



スティック材又は金属等の吐出口部を接合したもの等がある。尚該容器の一部又は全部を透明又は半透明にし、内包する現像剤の内容量を目視できるようなせば、現像剤補給完了を確認できて効果的である。更に前記容器1の吐出口部1Bの内側にはシール部材2により密封されていて、内包されている現像剤Tの漏出を防止している。該シール部材2はアルミ箔等の金属薄膜や加工紙、プラスチックフィルム等により作られ、接着剤等により前記吐出口部の内側に強く接着されている。上記シール部材2は、現像剤補給時には後述の突起部材によって突き破られ易い材料と膜厚を有するものである。

次に第4図は本考案による現像剤タンクを示す断面図である。現像剤タンク10は現像剤Tを収容する筐体10Aと、現像剤補給口を構成し、前記現像剤容器1の側壁に嵌合する開口部10Bと、現像剤補給時に該開口部10Bの上部を開閉させる外蓋11と、上記開口部10Bの下方に取りつけられ現像剤補給時に現像剤容器1の着脱に連動して開閉自

在となる弾性蓋 12 と、上記現像剤タンクの筐体 10  
A の内部下方に固設された突起部材 13 等から構成  
されている。

また上記弾性蓋 12 は、ポリエチレン、ポリプロ  
ピレン、ポリウレタンその他のプラスチック又は  
ネオプレン等の合成ゴム等の材質を用い単層又は  
ラミネート層で形成され、かつ第 5 図に示すよう  
に放射線状の複数本の切込みを有す。この切込み  
により形成された複数の舌片はそれぞれ弾性を有  
し、外力により押し開かれ開通状態になり、外力  
を除くと再び厚状に復帰して板状になって閉鎖状  
になる。

更に前記現像剤タンクの筐体の内部下方に固設  
された前記突起部材 13 はステンレス鋼、アルミニ  
ウム等の金属又は硬質プラスチック材で作られ、  
その先端部 13 A は鋭く尖り、前記のシール部材 2  
を突破する作用をなし、テーパー部 13 B は該シー  
ル部材 2 を大きく劈開する作用をなし、肩部 13 C <sup>(部)</sup>  
は前記容器 1 を所定の高さに保持するため吐出口  
11 B に当接する段付突当である。また該突起部材

13 は、その側面に複数の深溝 13 D を形成していて、現像剤容器から吐出する現像剤の流下通路を形付ける。この深溝 13 D の形状としては、ツイストドリルのようなスパイラル状の深溝、あるいはストレートリーマのようなストレート状の深溝等が良く、かつ現像剤補給を速やかに行なうためには適当な深溝寸法が必要である。

第 6 図は本考案による現像剤容器 1 と現像剤タンク 10 とを接続して現像剤補給を行なっている状態の断面図である。

先ず現像剤 T を内包する現像剤容器 1 の保護キャップ（不図示）を外し、現像剤タンク 10 の外蓋 11 を開く。次に該容器 1 を倒立した状態に保持して、該容器 1 を上記現像剤タンク 10 の開口部 10 B に挿入し押し下げて、容器の吐出口部 1 B の先端が突起部材の肩部 13 C に突き当たって止まるまで確実に押し下げる。

上記の容器押し下げ操作に連動して以下の作用が次々となされて現像剤は補充を始める。即ち先ず弾性蓋 12 が押し開かれ、更に容器が降下すると

突起部材 13 の先端部 13A により容器のシール部材 2 が突き破られ、テーパー部 13B により該シール部材 2 は大きく切り開れて、容器内と現像タンク内とは開通状態となり、容器内の現像剤 T は前記深溝 13D に沿って流下して現像タンクの筐体 10A 内に補充され、この間現像剤 T は全く外部に流出することなく補給が行なわれる。

現像タンク内への現像剤の補充完了後に、容器 1 を引き出せば、前記弾性蓋 12 は自己の弾性復元力により自動的に閉じて、現像剤タンク 10 内の現像剤粉塵は殆んど外部に漏出することはない。容器 1 を現像タンクの開口部 10B から引き出し終わら外蓋 11 を閉じると、現像剤タンク 1 内よりの現像剤漏出や現像剤タンク 1 外よりの異物混入等は全く遮断され密閉状態となる。

また前記シール部材 2 の他の実施例としてミシン目付きキャップ部材 3 を第 7 図に示す。図は該キャップ 3 を用いて密封状態となした現像剤容器の平面図である。図において破線で示すミシン目は一部分を残してほぼ円周状に形成され、該ミシ



ン目は現像剤の漏出しにない程度に浅く、かつ外力によって切断しやすい形状をなしている。上記キャップは加工紙等で作られ前記容器の吐出口部1Bの内側に接着剤等により強く密栓状態になっている。

現像剤補給時に、現像剤容器を現像剤タンクに挿入することにより、前記キャップ部材3は前記突起部材13により一部を残して切り開かれ、容器内の現像剤を通過吐出させる。

補給完了後は容器1を引き抜いても、前記キャップ部材3は容器1内に残るので、現像剤タンク10内に落ちることはない。

尚、本考案の現像剤補給容器および現像剤タンクは、磁性粉体のキャリアと樹脂粉体トナーとから成る二成分系現像剤におけるトナー補給容器、磁性粉体を樹脂粉体トナー中に分散させた一成分系現像剤の補給容器、あるいはこれらに類する他の現像剤（粉霧現像剤等）の補給容器等、即ちあらゆる粉体現像剤補給容器に用いて効果を発揮するものである。

以上の説明から明らかなように、本考案の現像剤補給容器及び現像剤タンクより成る現像剤補給装置を用いて、複写装置等の現像装置に現像剤を補給した場合は、上記容器は密封された状態で現像剤タンクの補給開口に接続し密閉状態となり、該容器を押し下げる動作によって密閉状態の接続部において該容器のシール部材が劈開され大きく開かれて現像剤は補給されるので、現像剤の外部飛散漏出による諸弊害を防止することができ、容易に現像剤補給作業が遂行でき、かつ補給装置を簡単に構成できる等の利点を有する。

#### 4. 図面の簡単な説明

第1図および第2図は従来の現像剤容器による補給状態を示す斜視図および断面図、

第3図は本考案の一実施例を示す現像剤容器の断面図、

第4図は本考案の一実施例を示す現像剤容器の断面図、

第5図は本考案の現像剤タンク内の弾性蓋の斜視図、



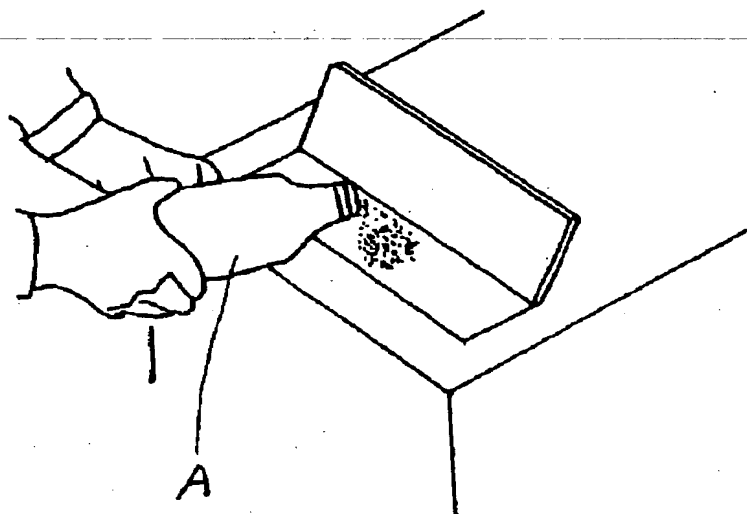
第 6 図は本考案の現像剤補給装置による現像剤補給状態を示す断面図、

第 7 図は本考案の他の実施例の現像剤容器の平面図である。

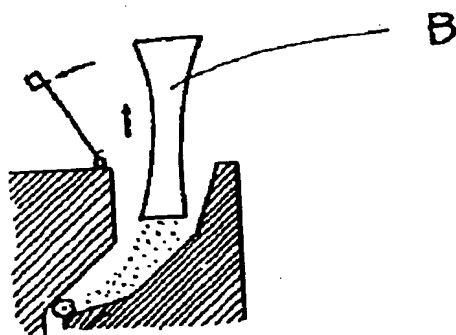
- |             |              |
|-------------|--------------|
| 1 … 現像剤容器、  | 2 … シール部材、   |
| 3 … キャップ部材、 | 10 … 現像剤タンク、 |
| 12 … 弾性蓋、   | 13 … 突起部材、   |
| T … 現像剤     |              |

代理人 桑 原 義 美

第1図



第2図

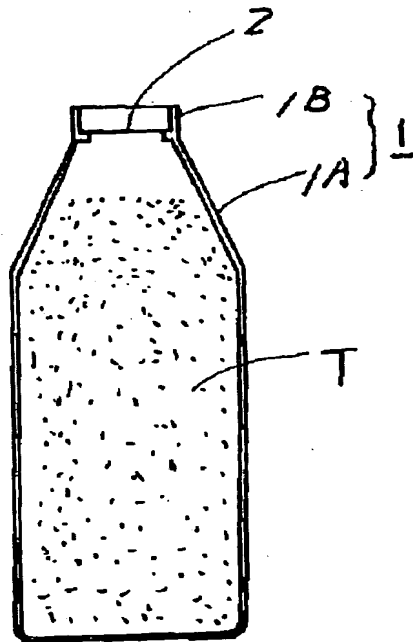


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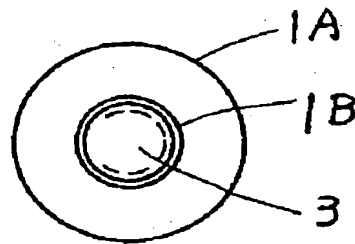
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第3図



第7図

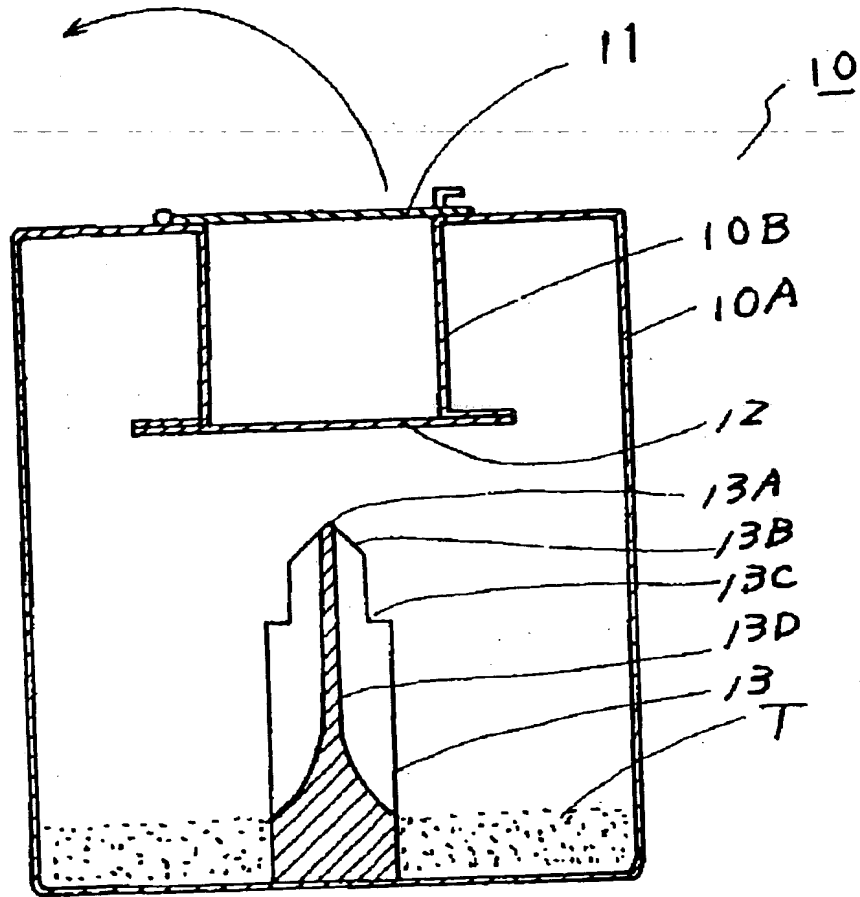


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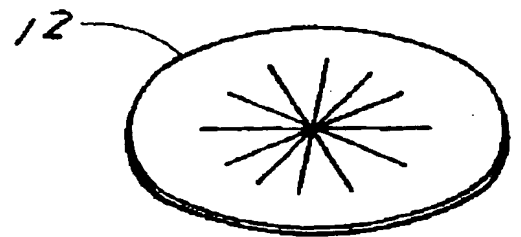
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第4図



第5図

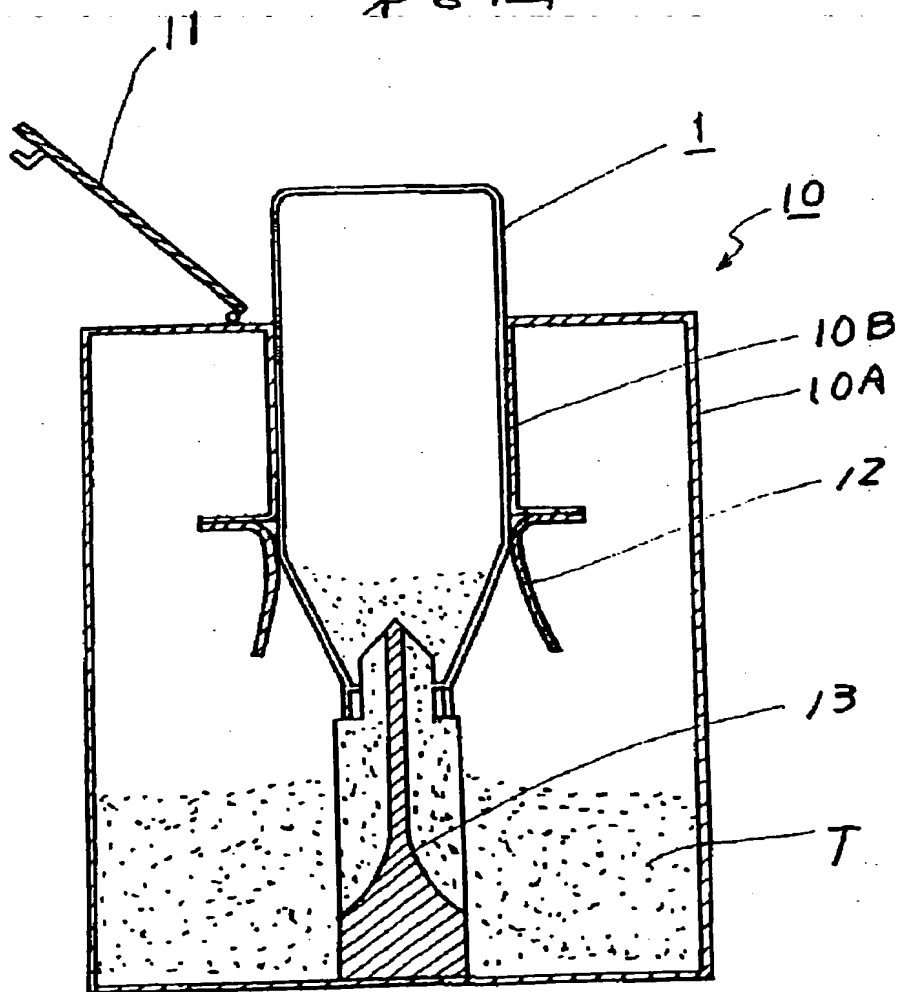


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代理人 桑原義美

第 6 図



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実開 〇〇 〇 〇 〇

代理人 桑 原 義 美

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